MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY,

CONTAINING

PAPERS,

ABSTRACTS OF PAPERS,

AND

REPORTS OF THE PROCEEDINGS

OF

THE SOCIETY,

FROM NOVEMBER 1867, *TO JUNE* 1868.

VOL. XXVIII.

BEING THE ANNUAL HALF-VOLUME OF THE MEMOIRS AND PROCEEDINGS OF THE ROYAL ASTRONOMICAL SOCIETY.

LONDON:

PRINTED BY

STRANGEWAYS & WALDEN, CASTLE STREET, LEICESTER SQUARE.

1868.

Digitized by the Internet Archive
in 2026

https://archive.org/details/monthly-notices-of-the-royal-astronomical-society_1867-11-08_28_1

MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY.

VOL. XXVIII. *November* 8, 1867. No. 1.

Rev. CHARLES PRITCHARD, M.A., President, in the Chair.

Thomas Michael Almond, Esq., Scarborough;
Samuel Courtauld, Esq., Gosfield Hall, Essex; and
Edwin Story, Esq., Alnwrah Road, Islington,
were balloted for and duly elected Fellows of the Society.

Volumes XXXV. and XXXVI. of the *Memoirs* are now published. Vol. XXXV., price to Fellows, 14*s.*; to the public, 25*s.* Vol. XXXVI. (without *Monthly Notices*) to Fellows gratuitously. Price of ditto (with *Monthly Notices*) to the public, 10*s.* Pursuant to a recent Resolution of the Council, each Fellow is entitled to receive a copy of Vol. XXXVI. and of every subsequent volume of the *Memoirs*, on *personal* application by himself or his agent, at the Apartments of the Society, provided that such application is made within three years from the end of the year in which the volume is published.

The Annual Parallax of Sirius deduced from North Polar Distances observed with the Transit-Circle at the Royal Observatory, Cape of Good Hope, 1856–1863. By Cleveland Abbe, Esq.

This fine series of meridional observations, of which 136 are direct and 12 reflexion, is divided as follows:—

1856	25 D	7 R	1858	4 D	1860	33 D	5 R	1862	21 D
1861	2 D		1859	2 D	1861	8 D		1863	41 D

The observers and the share that each has taken in the work are shown by the following:—

Sir Thomas Maclear	34 observations	T. D.	1 observation.	
		G. C.	14	,,
George Maclear	61 ,,	C. D. F.	25	,,
William Mann	6 ,,	J. F.	7	,,

The crude observations are not at hand, but instead thereof, a series of corresponding mean N. P. D.'s for the beginning of each year; these numbers are presumed to have been obtained by adding to the mean declination of the *British Nautical Almanac* the difference between the tabular and observed apparent declination. Nothing has been communicated concerning the methods of observation and reduction.

It is proposed to reduce these N. P. D.'s to the mean equinox of 1860·0, using the variable proper motion resulting from the investigations of Dr. Auwers, as published in No. 1506 of the *Astronomische Nachrichten*. Dr. Auwers has given his results in the form of corrections to the mean distances of Bessel's *Tabulæ Regiomontanæ*, using Zech's continuation of the *Tab. Reg.* for 1850–1860, and Wolfers' *Tabulæ Reductionum* for 1860–1880, minus the corrections given in his Introduction. We thus receive the following system of mean declinations:—

Year.	Auwers. Mean δ,	Auwers. Red. to 1860·0.	British Naut. Alm. Mean δ,	British Naut. Alm. Red. to 1860·0.
1856	−16° 31′ 19″·231	−18″·923	−16° 31′ 19″·70	−18″·46
1857	23·953	−14·201	24·32	−13·84
1858	28·682	− 9·472	28·93	− 9·23
1859	33·417	− 4·737	33·54	− 4·64
1860	38·154	0·0	38·16	0·0
1861	42·898	+ 4·744	42·78	+ 4·62
1862	47·644	+ 9·490	47·40	+ 9·24
1863	52·391	+14·237	52·03	+13·87

The mean δ from the *Nautical Almanac* for 1856 has received the correction +0″·02 to reduce it to Jan. 0 ⊙ = 280°. The

comparison of the annual variations deduced from the declinations of Auwers and the *Almanac* shows that we must add to each individual mean declination the correction $+0''\cdot12\ \tau$, in order to reduce it to the beginning of the year with Auwers' proper motion We thus have as the foundation of further investigations,

Given mean δ + ($0''\cdot02$ for 1856) + $0''\cdot12\ \tau$ + Auwers' Reduction to 1860·0
$= -16^\circ\ 31'\ 36''\cdot20$ + function of parallax and other unknown quantities.

Our first inquiry should now be, how far the given observations are free from constant errors that will undermine the security of any resulting value of the desired Parallax. Knowing but little of the methods pursued by the different observers, it is evident that each must be supposed to have a different constant error, whilst the corrections to the proper motion and the constant of aberration should be zero. The correction of the thermometer coefficient in the refraction will be assumed zero for want of proper material to determine it. Our equations of the condition should therefore be of the form

$$\text{Mean } \delta\ 1860\cdot0 = +16^\circ\ 31'\ 36''\cdot20 + x_1 + x_2 + x_3 + x_4 + y\ [9\cdot8065] \sin(\odot - 4^\circ\cdot3) + z\ (t - 1860\cdot0) + w\ [9\cdot8065_n] \cos(\odot - 4^\circ\cdot3)$$

or

$$0 = n + x_1 + x_2 + x_3 + x_4 + a\,y + b\,z + c\,w,$$

x_1, x_2, x_3, x_4 being the constant corrections for G.M., T.M., G.C., C.D.F., respectively: y the parallax, z the correction to the proper motion, w the correction to the aberration $20''\cdot45$.

Our observations are not sufficient for the determination of so many unknowns, and we will make a first solution, omitting $b\,z$ and $c\,w$. We have the following normals:—

$$\begin{aligned} 61\,x_1 - 1\cdot32\,y + 8\cdot71 &= 0 \\ 34\,x_2 + 8\cdot35\,y - 2\cdot00 &= 0 \\ 14\,x_3 - 4\cdot99\,y + 4\cdot06 &= 0 \qquad [nn] = 104\cdot21 \\ 25\,x_4 - 7\cdot19\,y - 23\cdot25 &= 0 \\ -1\cdot32\,x_1 + 8\cdot35\,x_2 - 4\cdot99\,x_3 - 7\cdot19\,x_4 + 33\cdot61\,y - 1\cdot72 &= 0 \end{aligned}$$

whence I.

$$\begin{aligned} x_1 &= -0''\cdot136 \quad \pm 0''\cdot058 \\ x_2 &= +0''\cdot006 \quad\ \ \cdot080 \\ x_3 &= -0''\cdot209 \quad\ \ \cdot124 \\ x_4 &= +0''\cdot995 \quad\ \ \cdot093 \\ y &= +0''\cdot227 \quad\ \ \cdot084 \end{aligned}$$

Prob. error of one observation $= \pm 0''\cdot450$

The observations of Mr. George Maclear are also alone suf-

ficiently numerous to authorise an independent solution. We have the normals

$$61\,x_1 - 1{\cdot}32\,y + 8{\cdot}71 = 0$$
$$-1{\cdot}32\,x_1 + 15{\cdot}47\,y - 6{\cdot}99 = 0$$

whence II.

$$x_1 = -0{\cdot}133$$
$$y = +0{\cdot}440$$

The computation of the residual errors from the solution I. gives us

Prob. error	1 observation	G. M.	61 obs.	$\pm$ 0″·46
		T. M.	34	0·26
,,	,,	G. C.	14	0·39
		C. D. F.	25	0·78
,,	,,	C. D. F.	24	0·65

This second value for C. D. F. being found by omitting the observation of 1863, Jan. 21, whereof the discordance $-3''{\cdot}46$ is much larger than should be attributed to the accidental errors of good observers. We have in this solution given the same weight to all observers and observations. There are twenty-one cases in which the image of the star is noted as very bad, execrable, a mere blotch, &c. Collecting these, we find,

Prob. error	1 obs.	bad image	$\pm$ 0″·50
,,	1 obs.	ordinary	$\pm$ 0″·48

The above Annual Parallax seems to be the most reliable that can be drawn from the given observations; and if we compare its value $+0{\cdot}227 \pm 0''{\cdot}084$ with that drawn from the observations of Maclear in 1836–37 by Dr. Gylden,* — viz., $+0''{\cdot}193 \pm 0''{\cdot}087$, we find the agreement sufficiently satisfactory. But the latter value is entitled to greater confidence, inasmuch as the zero point of the circle was eliminated by the direct and reflexion observations.

That constant errors have been present in the series now under consideration, and which may have exerted a prejudicial influence upon the resulting parallax, will be suspected from the following solution. We combine, namely, all the 148 observations, the equations of condition being of the form

$$0 = n + x + ay + bz + ew,$$

where the personal differences are considered as smaller than their probable errors.

* *Bulletin de l'Académie Impériale des Sciences de St. Petersbourg*, 1864, April.

We obtain then the following normals:—

$148\,x$	$-10{\cdot}48\,y$	$+\ 118{\cdot}52\,z$	$-28{\cdot}96\,w$	$-17{\cdot}''49 = 0$	
$-\ 10{\cdot}48$	$+36{\cdot}55$	$-\ 62{\cdot}37$	$+14{\cdot}62$	$-\ 0{\cdot}04 = 0$	
$+118{\cdot}52$	$-62{\cdot}37$	$+1001{\cdot}58$	$-17{\cdot}80$	$-71{\cdot}97 = 0$	$[nn] = 112{\cdot}32$
$-\ 28{\cdot}96$	$+14{\cdot}62$	$-\ 17{\cdot}80$	$+24{\cdot}36$	$+\ 8{\cdot}22 = 0$	

whence III.

	$x = -0{\cdot}''029$	$\pm 0{\cdot}''056$	
	$y = +0{\cdot}350$	$\cdot 116$	
	$z = +0{\cdot}078$	$\cdot 0201$	$[nn4] = 102{\cdot}24$
	$w = -0{\cdot}517$	$\cdot 153$	
Prob. error	1 obs. =	$\pm 0{\cdot}562$	

The large corrections to the aberration and proper motion, as well as the large parallax, may serve to render these results inadmissible. A portion of the entire change in the value of the parallax may be due to the large personal error of C. D. F. For the other observers our hypothesis $x_1 = x_2 = x_3$ may be admitted; and in general we may notice that the entire series will be better fitted to the determination of parallax and aberration if the year 1863 is omitted, as its observations are all included in the first three months. Omitting these observations (including more than one half of those made by C. D. F.) and retaining the same unknowns, we have

$1{\cdot}07\,x$	$+\ 4{\cdot}88\,y$	$-\ 9{\cdot}30\,z$	$-11{\cdot}35\,w$	$+0{\cdot}''78 = 0$	
$+\ 4{\cdot}88$	$+28{\cdot}50$	$-\ 14{\cdot}75$	$+\ 9{\cdot}37$	$-8{\cdot}95 = 0$	$[nn] = 50{\cdot}191$
$+\ 9{\cdot}30$	$-14{\cdot}75$	$+602{\cdot}68$	$+37{\cdot}49$	$-9{\cdot}84 = 0$	
$-11{\cdot}35$	$+\ 9{\cdot}37$	$+\ 37{\cdot}49$	$+15{\cdot}62$	$+0{\cdot}17 = 0$	

whence IV.

	$x = -0{\cdot}''084$	$\pm 0{\cdot}''046$	
	$y = +0{\cdot}560$	$\cdot 102$	
	$z = +0{\cdot}0622$	$\cdot 0210$	$[nn] = 44{\cdot}59$
	$w = -0{\cdot}546$	$\cdot 154$	
Prob. error	1 obs. =	$\pm 0{\cdot}438$	

The aberration and proper motion corrections being properly considered only as tests, unless we give attention to the newly published investigations of Dr. Klinkerfues, we shall derive our most reliable value of the unknowns x and y from the preceding equations, by neglecting the other two, z and w.

We thus have

	$x = -0{\cdot}''022$		V.
	$y = +0{\cdot}318$	$\pm 0{\cdot}08$	$[nn2] = 47{\cdot}33$

The proper result for parallax will, however, be that of solution I., or perhaps still better, a similar solution in which $x_1 = x_2 = x_3$ is assumed. We thus have

$109\,x_1$		$+\ 2{\cdot}04\,y$	$+10{\cdot}77 = 0$	
	$25\,x_4$	$-\ 7{\cdot}19\,y$	$-23{\cdot}25 = 0$	$nn = 104{\cdot}21$
$+204\,x_1$	$\pm 7{\cdot}19\,x_4$	$+33{\cdot}61\,y$	$-\ 1{\cdot}72 = 0$	

whence

	x_1 $-0''{\cdot}102$	$\pm 0''{\cdot}056$	
	x_4 $+1{\cdot}008$	$0{\cdot}132$	$[nn\,3] = 79{\cdot}17$
	y $+0{\cdot}273$	$0{\cdot}102$	
Prob. error 1 obs.		$\pm 0{\cdot}576$	

previously where we have neglected such constant errors as are manifested by the results of the III. and IV. solutions.

The result of our investigations is, therefore, to be considered as at least corroborative of the conclusion drawn by Mr. Henderson, as given in his Memoir in vol. xi. of the *Memoirs of the Royal Astronomical Society*, that "the parallax of *Sirius* is not greater than one-half of a second of space," the precise statement being

$$\pi = +0''{\cdot}27 \pm 0''{\cdot}10$$

Poulkova, May 1866.

On some newly discovered Stars near α Lyræ.
By J. Buckingham, Esq.

About four years since, during a visit by Mr. Hartnup, when looking through my 20-inch object-glass (made by Wray), which is mounted equatoreally, we perceived a very small, yet bright, star near *Vega*, which appeared precisely situated on an imaginary line from A to B, the well-known companion; but, owing to the state of the air, it could only occasionally be seen. It has been repeatedly verified since.

In the autumn of 1865 its brightness had much increased, and it was more easily seen than at the time of its discovery, yet not sufficiently so to be perceived with my 9-inch object-glass (also by Wray), which is as fine as possible, in my opinion, to be made; its focus is $14\frac{1}{2}$ feet. This star *c* since the earlier part of August is fainter than before observed, and its position-angle has increased since its discovery, being now (November) to the S.W. of the former place, which was on the line from A to B, but now

sensibly to the apparent left of it, its distance appearing to be about $\frac{1}{8}$ that of B from A.

On the 10th May, 14^h P.M., 1867, with the same object-glass (20-inch) another small star *d* was perceived, about 90° or 95° greater in its position-angle than the star *c*; also rather more distant and not so bright as it; and only seen by glimpses during moments of fine definition; but I could not perceive either *c* or *d* with the 9-foot Equatoreal.

On July 19 last, my friend, the Rev. R. Crowe, of Huddersfield, was looking at α *Lyræ* through the 9-foot Equatoreal (driven by the Foucault clock), and had only a short time been so occupied when the star *c* was seen, of which he made a diagram by my request; and the estimated distance from A was $\frac{1}{7}$ of that of B. After a few more moments he perceived the star *d*, and placed its position on the previous diagram, when I showed him my own previous sketch, and they perfectly accorded so far as to be seen that they were the same objects. Mr. Crowe had not received the slightest intimation of my known positions; but to him they were "easily seen:" for myself, had I not known of the previous existence and positions, it is probable they would in this instrument have been overlooked. Although there was not the slightest perceptible tremor of the atmosphere, the images being absolutely steady, every known precaution was taken to avoid the chance of error, as various eye-pieces were used, and were rotated, as well as the object-glass; and the instrument was used several times on each side of the polar axis with like results. It was necessary to use powers of 250 and upwards, the two stars not being visible with lower ones; but being best seen with 440.

On August 10, 1867, some visitors (well-known good observers) looked through the new 21$\frac{1}{4}$-inch object-glass. The air was rather unsteady, with considerable "flying scud," yet they each could see both stars *c* and *d*. They left about 11 P.M., as the atmosphere prevented further observation, it being entirely clouded over. Some time after they had left the Observatory, the night cleared up, and became brilliant,—perhaps more so than usual in my experience,—and I was induced to go again to the large telescope to examine some nebulæ. After some time I again turned the instrument on α *Lyræ*, and directly perceived another new star *e*. As *a* entered the field of the eye-piece, it was north, preceding, at an angle about 295°, distance about 34 seconds or more of arc. It had at least three times the light of the others *c* and *d*, and was best seen with powers 630 and 850, appearing of purple tint; and about the brilliance of the pole-star companion in a 3-inch aperture and power 100, but it has since become brighter.

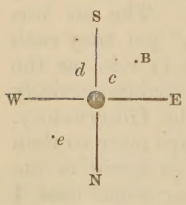
c is brighter than *d*, but they are both too faint for estimation of colour by myself, and can only be seen in a tolerably good state of the air; and I estimate their brilliance in the large object-glass as little exceeding that of the companion of *Polaris*, as seen

by myself with a power of 80 in an object-glass of 1·7 inch aperture,— that is, just steadily visible now (in November).

The few succeeding remarks may be necessary to show why the larger instrument was not used during Mr. Crowe's observations; having just had a new object-glass of 21¼ inches made, and for the purpose of testing its quality.

In the beginning of July last the former object-glass of 20 inches was taken out of its cell, which latter was temporarily adapted to the new and larger object-glass, which was tried on July 8th, and its performance being found excellent, with powers up to 1800, there being fine definition on suitable objects, as γ^2 *Andromedæ*, γ *Equulei*, δ *Cygni*, ζ *Herculis*, and the excessively faint double star near A and B *Capricorni*, I decided to alter the old tube and reduce its length to that of the new object-glass, viz. 25⅔ feet; which alterations were not complete till July 28th; so that I had no larger instrument in use, at the time Mr. Crowe paid me a visit, than the 9-inch Equatoreal; but since the end of July, this 21¼-inch object-glass has been used on every night since that opportunity gave me, and its performance is very satisfactory on double stars; equally so on nebulæ; and in the "Dumb Bell" many stars are readily visible on its surface. The detail on the Moon is remarkable; the smaller satellites of *Uranus* are pretty bright: that of *Neptune* has been observed. The 5th and 6th stars in the trapezium of *Orion* are wonderfully bright objects, and the detail and brilliance of the nebula itself astonishing.

Rough Diagram of Positions.



The discovery of these minute points of light near a star, so often under the scrutiny of nearly every observer, will doubtless interest most of our Members, as there are many instruments in this country capable of reaching these specks under favourable circumstances, independently of any speculations as to their physical connexion with A; and the belief that a report of the performance of so large an object-glass of English manufacture would be desirable to be known to our Society, is my apology for the length of this communication.

November 8, 1867.

Description of an Observing Chair. By the Rev. W. R. Dawes.

I beg the Society's acceptance of a few copies of a photographic picture of an observing chair, which I contrived and had made some years ago. I have found it more convenient and useful than any other I have ever met with of moderate size and expense.

The general plan of its construction will be obvious from the picture. A few points may require a little further explanation.

The angle of the slanting upper part of the frame is about 30°. The left-hand slanting timber is notched throughout its length; and, attached to the sliding body composed of the seat and back, is a stout catch which falls into the notches as the chair is raised; and, when lifted up by the left hand of the observer, permits the chair to descend.

The back is supported by a stout quadrant of iron, toothed on the under side; and a catch is forced by a spring into the teeth as the back is raised, to support it at any convenient elevation. The catch can be easily pushed out of the teeth by the observer reaching behind him with one hand, while he diminishes the elevation of the back with the other.

On the right-hand side of the back is an arm which can be raised or lowered at pleasure, so as to prevent fatigue to the right arm by supporting the elbow, and to keep the hand steady in the management of the micrometer.

The angle which the slanting frame makes with the horizon is arranged so that when the seat is raised nearly to the top, the observer's eye may be at about the same height from the floor as it would be if he were standing. Of course, the angle may be varied with regard to the distance of the pillar of the equatoreal from the wall of the room, and to the height of the declination axis above the floor.

On the left side, attached to the upright timber near the middle of the frame, is a long and stout bolt, having a sharp point, which is so arranged as to be quite free from the floor when entirely drawn up, and so pierce the floor when forcibly pushed down. This enables the observer to *cast anchor*, and prevents the chair from being accidentally moved from the most convenient place.

The first chair of this kind was made at Wateringbury when I was residing there; but during my residence at Haddenham, several have been made here under my superintendence for some eminent observers. One of them is in the Royal Observatory at the Cape; and, as I have been informed, is highly esteemed by Sir Thomas Maclear; and one is now in hand for our Secretary, Mr. Huggins. The simplicity of their construction renders it almost impossible for them to get out of order, as is proved by the fact, that the first which was made, about fifteen years ago, and has

been in constant use the whole time, has never needed any repair, and now works as well as ever.

Hopefield Observatory, Haddenham, Bucks,
1867, Nov. 6.

P.S. To render the different parts more distinct, I have drawn the following sketches.

Fig. 1.

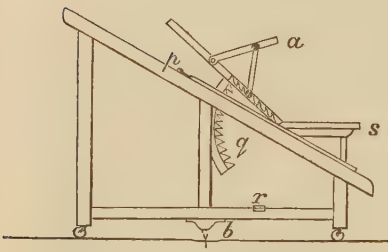


Fig. 1. Right Side.

a. *Arm*, for supporting the observer's elbow at any convenient height.
b. *Bolt*, for anchoring. Sharp point *pushed into floor*.
p. *Pin*, by pressing which the spring is pushed out of the teeth of the the *quadrant p*.
r. *Rail* across the lower frame for supporting the feet. May be removed if ever in the way of the iron quadrant *q*.

Fig. 2.

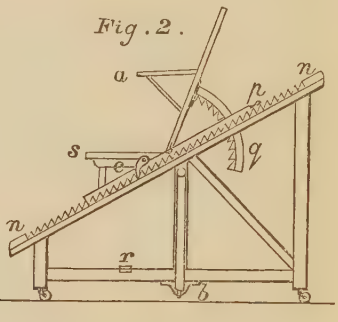


Fig. 2. Left Side.

a. See Fig. 1.
b. *Bolt*, as fixed on the middle upright timber; represented as *drawn up*.
c. *Catch*, which falls into the notches (*n n*) in the slanting timber, and supports the seat (*s*).
p. See Fig. 1.
q. Iron toothed *quadrant*.
r. See Fig. 1.

Jupiter without a visible Satellite. By the Rev. W. R. Dawes.

On the evening of August 21st, clouds prevented observations of the planet till the fourth satellite was very near the eastern edge of the disk. Its light was small and its colour rather ruddy. The first satellite, which was near it, had two or three times the light of the fourth. Clouds prevented observation of the entrance of the fourth upon the disk. It was a little past 10^h before the planet was moderately well seen. The third, fourth, and first satellites were then all visible on the disk, together with their shadows.

In the best state of the atmosphere I found power 412 the most efficient on my 8-inch refractor. Watching for the best

views with this power, I carefully examined each of the six objects visible on the disk.

Contrary to my expectation, the shadows of all the three satellites appeared to be equally black throughout. Not even on that of the fourth could I perceive any deviation from perfect blackness up to the very edge; and this precisely agrees with the results of all my previous observations; in which, however, I had not so carefully attended to this point. That there ought to be a sensible penumbra seems to be evident; but it has occurred to me since the observation, that the reason why it is not perceivable may be, that the edge of the shadow is in immediate contrast with the bright surface of the planet; and therefore, though not quite so black as its centre, it appears so by contrast.

The *fourth* satellite was so dark that I could not satisfy myself that it was decidedly less dark than its shadow. Nor could I be sure of any variation of tint in different parts of the satellite, or of any obvious deviation from perfect roundness. Indeed it could only be distinguished from its own shadow by its smaller size. That there should be no irregularities observable in the dark shade of this satellite surprised me much, as I have formerly noticed such without great difficulty.

The careful scrutiny of the *third* satellite furnished a very different result. The north-eastern side of it was remarkably bright, while the opposite side was nearly as dark as its shadow. Usually the satellite seemed to be about equally divided between the bright and dark portions; but during the finest views the true form of the dark part came out with satisfactory distinctness; and it then forcibly reminded me of the form which I had on more than one occasion depicted. (See *Monthly Notice*, April 1860, figs. 2 and 3). But it occupied an almost directly opposite part of the satellite, namely, the south-west instead of the north-east; thus,—

Occasionally the narrow white channel between the two dark protuberances was clearly seen, though by too transient views.

Hopefield Observatory, Haddenham, Bucks,
1867, *Nov.* 6.

P. S. The substance of this paper, with the illustrative sketch of the third satellite, has already appeared elsewhere, because it was important that, if possible, the remarkable appearance of the satellite should be looked for during every transit which would occur in the present apparition, by all observers who possess sufficiently powerful telescopes.

On Jupiter without Satellites exterior to his Disk.
By T. W. Burr, Esq.

Being desirous of witnessing the appearance above referred to, I visited my friend Mr. Slack, of Camden Square, N.W., on the night of August 21st, he having in his Observatory an excellent $6\frac{1}{2}$-inch silvered glass mirror, mounted equatoreally by Mr. Browning. Unfortunately the weather was most unfavourable,— dense masses of clouds obscuring the heavens; and it was not until nearly 10 o'clock that a break occurred, enabling us to see the planet with only one satellite (the 1st) remaining outside the disk. The shadows of two others (the 3d and 4th) were also seen projected on the southern equatoreal belt with another, not so well defined, object between them. Soon after 10 o'clock a second glimpse was obtained, and the 1st satellite seen just entering on the disk of *Jupiter*. A few more fleeting views were caught between $10^h 20^m$ and $10^h 30^m$, during which it was evident that the object seen between the shadows was the 3rd satellite itself; and that it was lighter in tint than the shadows, which were inky black, the satellite giving the impression of a browner colour. The shadow of the 1st satellite was also now visible, as black as the others, and not being thrown on a belt like those of the 3d and 4th, but on a clearer space, was very conspicuous. The clouds then closed up so thickly that no further observations could be made during the time the transits and occultation continued. Four spots, being three shadows and one satellite (the 3rd), were therefore distinctly seen, and, as I subsequently had a difficulty in localizing the shadow of the 1st satellite, my memory giving the impression of a spot both above and below the southern equatoreal belt, I have no doubt that at times I also perceived, in my hasty glimpses through the drifting clouds, the 4th satellite itself; which, if so, was as black as the shadows, and unlike the 3rd in its lighter tint. The power employed was 120, with the occasional change to 175; and the performance of the telescope, during the brief opportunities for observation, most excellent.

Islington, October 1867.

Determination of the Latitude of Kingston Observatory, Canada.
By the Rev. Dr. J. Williamson.

Having a portable transit 30 inches in length, I wished to employ it in correcting our roughly determined latitude; but our building not being fitted for observation in the prime vertical precluded the possibility of employing that method within doors,

while the situation of the Observatory, in a public park, was not such as to allow of using instruments out of doors. In this dilemma I resorted to the following method:—

The stand of the transit is supported by three foot-screws, one of which is directly beneath a Y of the instrument.

Beneath this foot-screw I adjusted a carefully made micrometer-screw, having a head divided into 100 parts.

I then determined the value of one division, partly by means of the level and partly by transits of stars, to be $0''.96$.

I then carefully adjusted the instrument for collimation and placed the axis in the meridian as nearly as possible, the thread intervals being previously obtained.

I next computed from the B. A. C. the places of several stars which pass within a few minutes of our zenith, limiting myself to those which would be confined to the web of the transit, or nearly so. When one of these stars was upon the meridian I brought that wire of the instrument which was nearest to it to coincide with it by turning the micrometer-screw.

In this manner I determined the distance at which the star would, when culminating, pass from the middle wire of the instrument when in its zero position, and hence the latitude.

The results of the several observations for this purpose are given below.

Date. 1865.	Star. B.A.C.	Comps.	Ded. Latitude.	Weight.
June 8	4841	N	44° 13′ 26″.6	10
10	,,	S	24.7	8
12	5400	N	23.1	8
,,	4841	S	16.3	8
16	4841	S	17.6	7
19	5400	S	18.3	8
21	4841	N	20.7	10
22	4841	S	21.6	10
,,	5400	S	23.3	9
23	4841	S	23.3	10
Aug. 14	6731	S	21.9	10
15	6013	S	18.9	8
16	6013	N	24.7	7
19	6013	N	44 13 21.8	10

Giving a mean value

$$\varphi = 44^\circ\ 13'\ 21''.7$$

with a probable error of $0''.7$.

Occultations of Stars by the Moon, observed at Forest Lodge, Maresfield. By Capt. W. Noble.

(Previously unreported.)

Friday, January 18, 1867, Occultation of 26 *Geminorum*.

The Star disappeared instantaneously at the Moon's dark limb at $3^h\,34^m\,38^s{\cdot}3$ L.S.T. = $7^h\,43^m\,40^s{\cdot}1$ L.M.T.

and reappeared at the bright limb at $4^h\,39^m\,21^s{\cdot}5$ L.S.T. = $8^h\,48^m\,12^s{\cdot}7$ L.M.T.

Power employed 135 on the micrometer.

Saturday, Sept. 7, 1867, Occultation of B. A. C. 6932.

The Star disappeared instantaneously at the Moon's dark limb at $20^h\,55^m\,20^s$ L.S.T. = $9^h\,49^m\,20^s{\cdot}5$ L.M.T.

The reappearance was not observed.

Power 154.

Sunday, Sept. 8, 1867, Occultation of ξ^2 *Sagittarii*.

The Star disappeared instantaneously at the Moon's dark limb at $20^h\,57^m\,18^s{\cdot}6$ L.S.T. = $9^h\,47^m\,22^s{\cdot}9$ L.M.T.

The reappearance was not observed, the Moon, as in the last case, having descended behind some trees.

Power 135 on the micrometer.

Note on the Lunar Eclipse of Sept. 13, 1867. By Capt. W. Noble.

I of course observed the Eclipse of the Moon on the night of the 13th of September ult.; but a transcript of my notes would possess very little interest; mainly referring, as they do, to the times of immersion in, and emersion from, the Earth's shadow of the principal craters. Inasmuch, however, as Mr. Browning has stated that he failed to detect any *colour* in the shadow, either when employing a reflector or a refractor, I may just say that in my own 4·2-inch refractor, the shadow presented what an artist would call a warm grey tint; and at the period of the greatest phase, and for some time afterwards, the Moon's limb N. of *Aristarchus* presented a strong copper tinge, which was particularly marked about $12^h\,42^m$.

Comet III. 1867.

Discovered 27th September by Herr Bäker, at Nauen, and 4 hours later by Dr. Winnecke. The following elements, calculated by Dr. Tietjen from Bonn and Vienna Observations of Oct. 1, and Berlin Observations of Oct. 10 and 17, are given, *Astron. Nach.* No. 1664:—

$$
\begin{aligned}
T &= 1867,\ \text{Nov. } 6{\cdot}99920 \text{ Berlin M.T.} \\
\pi - \Omega &= 148^\circ\ 36'\ 58''{\cdot}9 \\
\Omega &= 64\ 58\ 27{\cdot}1 \quad \text{Mean Equinox } 1867{\cdot}0 \\
i &= 96\ 33\ 30{\cdot}5 \\
\log q &= 9{\cdot}519074
\end{aligned}
$$

Minor Planet (92) *Undina.*

Discovered by Dr. C. H. F. Peters, at the Hamilton College Observatory, Clinton, U.S., July 9, 1867. The first observations were as follows:—

1867, July 7 $15^h\ 26^m\ 32^s{\cdot}5$ M.T. $\alpha = 21^h\ 20^m\ 51^s{\cdot}4$ $\delta = -21^\circ\ 31'\ 12''{\cdot}2$

by 10 comparisons with O. Arg. 2138; and the following morning, by 8 comparisons with the same star:—

1867, July 8 $15^h\ 20^m\ 0^s{\cdot}7$ M.T. $\alpha = 21^h\ 20^m\ 25^s{\cdot}94$ $\delta = -21^\circ\ 37'\ 24''{\cdot}2$

The following elements, calculated by Dr. Peters, are given, *Astron. Nach.*, No. 1665:—

Epoch 1867, Jan. 0·0 Berlin M.T.

$$
\begin{aligned}
M &= 304^\circ\ 10'\ 16''{\cdot}2 \\
\pi &= 334\ 29\ 30{\cdot}8 \\
\Omega &= 102\ 50\ 56{\cdot}1 \quad \text{Mean Equinox, } 1867{\cdot}0 \\
i &= 9\ 56\ 22{\cdot}0 \\
\varphi &= 5\ 58\ 27{\cdot}5 \\
\mu &= 622''{\cdot}3906 \\
\log a &= 0{\cdot}5039624
\end{aligned}
$$

The magnitude, October 4, being about 11·3.

Minor Planets (93) *and* (94).

No elements appear to be yet published of these last two Minor Planets discovered by Prof. Watson, Director of the Ann-Arbor Observatory, (93) August 24, and (94) September 6. The two planets were each of the magnitude 11.

ERRATUM.

Memoirs, Vol. XXXV.

In page 25, columns 5 and 6, of the Table, Comparison with Struve's Stars (Place by Chart for 1826) of Star, Struve 409, W. H. IV. 44,

For $3^h\ 31^m{\cdot}3\quad 70°\ 48'$, *read* $3^h\ 21^m+\quad 70°\ 15'\pm$.

CONTENTS.

	Page
Fellows Elected	1
Vols. XXXV. and XXXVI. of the *Memoirs*	ib.
The Annual Parallax of *Sirius* deduced from North Polar Distances observed with the Transit-Circle, 1856–1863, at the Royal Observatory, Cape of Good Hope, by Mr. Abbe	2
On some newly-discovered Stars near *α Lyræ*, by Mr. Buckingham ..	6
Description of an Observing Chair, by the Rev. W. R. Dawes	9
Jupiter without a visible Satellite, by the Rev. W. R. Dawes	10
On *Jupiter* without Satellites exterior to his Disk, by Mr. Burr	12
Determination of the Latitude of Kingston Observatory, Canada, by the Rev. Dr. Williamson	ib.
Occultations of Stars by the Moon, observed at Forest Lodge, Maresfield, by Capt. Noble	14
Note on the Lunar Eclipse of Sept. 13, 1867, by Capt. Noble	ib.
Comet III. 1867, discovered by Herr Bäker	15
Minor Planet (92) *Undina*, discovered by Dr. Peters	ib.
Minor Planets (93) and (94), discovered by Prof. Watson	ib.

Printed by STRANGEWAYS and WALDEN, Castle St. Leicester Sq. and Published at the Apartments of the Society, Dec. 10, 1867.